TAXONOMIC SIGNIFICANCE OF SPERMATHECA IN SOME INDIAN GRASSHOPPERS (ORTHOPTERA : UCRIDIDAE)[1]

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(*With twenty-three text-figures*)

Comparative study of spermatheca was made on twenty-three species representing twenty genera of the family Acrididae and its taxonomic significance is shown. Presence or absence of apical diverticulum, length and shape of apical and pre-apical diverticula of spermatheca are considered as characters of generic significance. The species studied are arranged under their respective subfamilies.

INTRODUCTION

The spermatheca is also known as *receptaculum seminis*, is an essential part of female reproductive system in which the spermatozoa are stored, and ejected upon eggs as the latter passed from the oviduct. Slifer & King (1936), Slifer (1939, 1940 a, b, c, 1943), Katiyar (1956) and Dirsh (1957) have shown the taxonomic significance of spermatheca in various subfamilies of Acrididae. We made an attempt to make a comparative study of spermatheca in twenty-three species representing nine subfamilies of Acrididae with a view to discover its significance for the identification of grasshopper genera. The species studied are assigned under their respective subfamilies.

MATERIAL AND TECHNIQUES

Adult specimens were collected from the central district of Manipur and Aligarh district of Uttar Pradesh. The apical half of the abdominal region was cut off and boiled in a test tube containing 5% KOH solution till the structure becomes transparent. Later, this was transferred to water and washed thoroughly for complete removal of KOH. It was then dissected under a dissecting binocular microscope with the help of fine needles in order to take out the spermatheca. After this, the normal process of dehydration was adopted and clearing was done in clove oil. The spermatheca was mounted in Canada-balsam under a 22 mm^2 cover glass. The slides were kept in a thermostat at a temperature of approximately 40°C for about four days to make it complete dry. Drawings were made with the help of camera lucida.

SPERMATHECA IN ACRIDIDAE

Subfamily : PYRGOMORPHINAE

1. **Chrotogonus trachypterus** (Blanchard) (fig. 1)—Apical diverticulum absent, pre-apical diverticulum long, tubular and curved. The same condition has been shown in *Chrotogonus* sp. by Slifer (1940a, fig. 20) and in *Chrotogonus concavus* Kirby by Katiyar (1956, fig. 3f).

2. **Poekilocerus pictus** (Fabricius) (fig. 2)—Apical diverticulum absent, pre-apical diverticulum long, tubular and curved. The same condition has been shown in *Poekilocerus vittatus* (Klug) by Uvarov (1966, fig. 88j).

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3. **Atractomorpha crenulata** (Fabricius) (Fig. 3)—Apical and pre-apical diverticula well developed, tubular and elongated. The former slightly longer and narrower than the latter. The same condition has been shown in *Atractomorpha ambigua* (Bolivar) by Slifer (1943, fig. 3).

Subfamily : HEMIACRIDINAE

4. **Hieroglyphus banian** (Fabricius) (fig. 4)—Apical diverticulum uniformly long and tubular, pre-apical diverticulum well developed. The same condition has been shown in *Hieroglyphus annulicornis* (Shiraki) by Slifer (1940b, fig. 59) and in *H. banian* (Fabricius), *H. concolor* (Walker) and *H. nigrorepletus* Bolivar by Katiyar (1956, figs. 2d-g).

5. **Spathosternum prasiniferum** (Walker) (fig. 5)—Apical diverticulum with basal half broader, shorter than the pre-apical diverticulum. Pre-apical diverticulum uniformly broad and curved. The same condition has been shown in the same species by Katiyar (1956, fig. 1i).

Subfamily : OXYINAE

6. **Oxya intricata** (Stal) (fig. 6)—Apical diverticulum long, bearing a small protuberance at its apical one-fifth ; pre-apical diverticulum broad and curved, thrice the width of apical diverticulum. The same condition has been shown in *Oxya adentata* Will. by Slifer (1940b, fig. 90).

7. **Oxya velox** (Fabricius) (fig. 7)—Almost similar with *Oxya intricata* except absence of protuberance on apical one-fifth of the apical diverticulum. The same condition has been shown in the same species by Slifer (1940b, fig. 91). The presence or absence of protuberance on apical diverticulum has a specific taxonomic significance.

Subfamily : EYPREPOCNEMIDINAE

8. **Choroedocus robustus** (Serville) (fig. 8)—Apical diverticulum uniformly broad, shorter than the pre-apical diverticulum, which is broader. The same condition has been shown in *Heteracris calliptamoides* Uvarov by Slifer (1940b, fig. 56).

9. **Eyprepocnemis alacris** (Serville) (fig. 9)—Apical diverticulum long and tubular, truncated at apex ; pre-apical diverticulum narrow at basal half and broadened at apical half. The same condition has been shown in *Eyprepocnemis shirakii* Bolivar by Slifer (1940b, fig. 51) and in *Eyprepocnemis roseus* Uvarov by Katiyar (1956, fig. 1f).

Subfamily : CATANTOPINAE

10. **Catantops pulchellus** (Walker) (fig. 10)—Apical diverticulum long and slender, narrower than pre-apical diverticulum, uniformly broad and bow-shaped. The same condition has been shown in *Catantops brunneri* Karny by Slifer (1940b, fig. 124) and in *Catantops humilis humilis* (Serville) and *Catantops splendens* (Thunberg) by Katiyar (1956, fig. 1c & d).

Subfamily : CYRTACANTHACRIDINAE

11. **Cyrtacanthacris tatarica** (Linnaeus) (fig. 11)—Apical diverticulum long and slender, longer and narrower than pre-apical diverticulum ; pre-apical diverticulum broad and horseshoe shaped.

Subfamily : ACRIDINAE

12. **Acrida exaltata** (Walker) (fig. 12)—Apical diverticulum short, apex truncated, shorter than pre-apical diverticulum ; pre-apical diverticulum is sac-like. The same condition has been shown in *Acrida gigantea* (Herbst) (fig. 13)

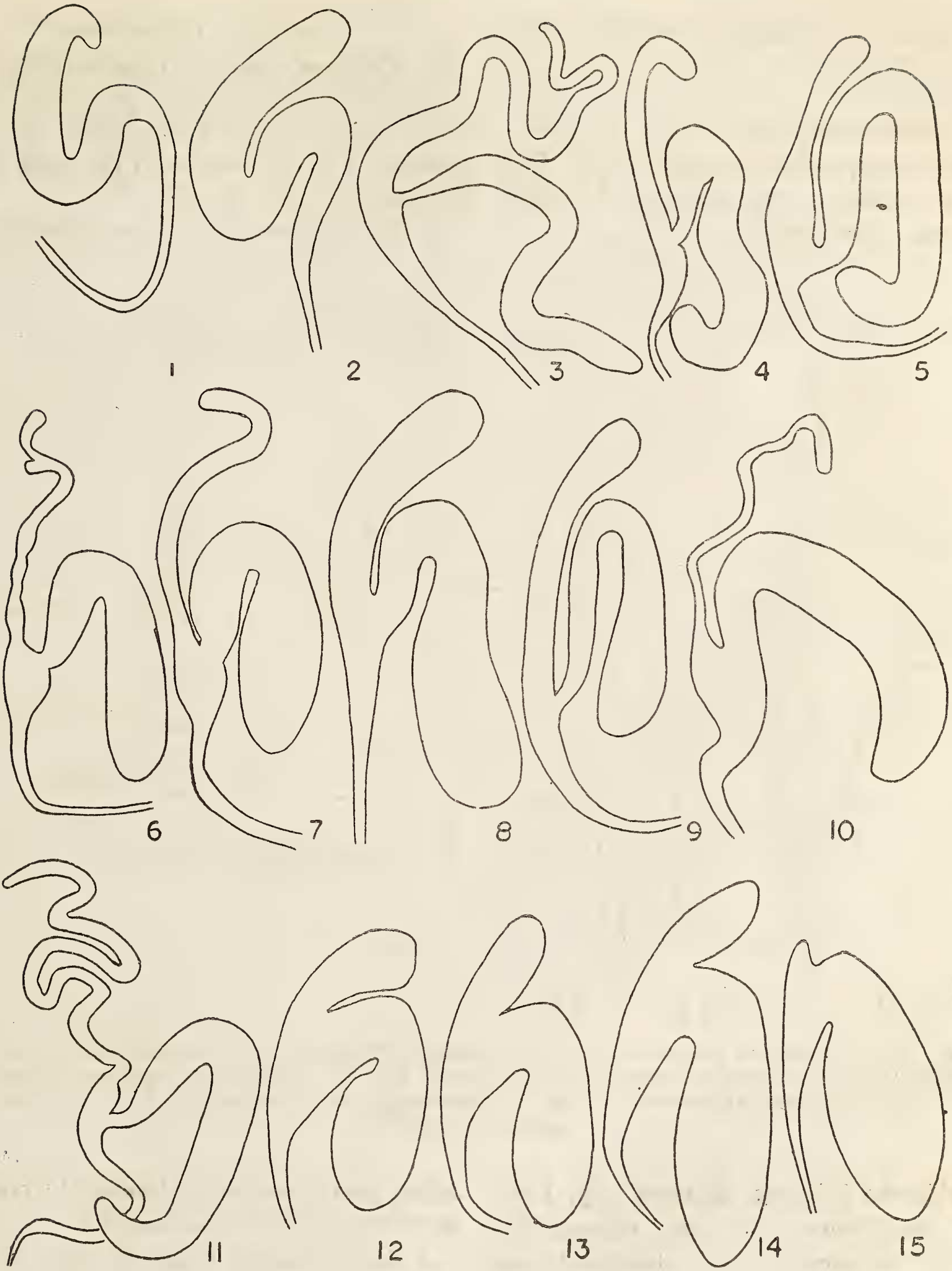

Fig. 1. *Chrotogonus trachypterus* (Blanchard); Fig. 2. *Poekilocerus pictus* (Fabricius); Fig. 3. *Atractomorpha crenulata* (Fabricius); Fig. 4. *Hieroglyphus banian* (Fabricius); Fig. 5. *Spathosternum prasiniferum* (Walker); Fig. 6. *Oxya intricata* (Stal); Fig. 7. *Oxya velox* (Fabricius); Fig. 8. *Choroedocus robustus* (Serville); Fig. 9. *Eyprepocnemis alacris* (Serville); Fig. 10. *Catantops pulchellus* (Walker); Fig. 11. *Cyrtacanthacris tatarica* (Linnaeus); Fig. 12. *Acrida exaltata* (Walker); Fig. 13. *Acrida gigantea* (Herbst); Fig. 14. *Ceracris nigricornis* (Walker); Fig. 15. *Phlaeoba infumata* (Brunner).

and in *Acrida turrita* (Linnaeus) by Slifer (1939, fig. 2).

14. **Ceracris nigricornis** Walker (fig. 14)—Apical diverticulum short, apex truncated. Pre-apical diverticulum long and broad, longer than apical diverticulum.

15. **Phlaeoba infumata** Brunner (fig. 15)—Apical diverticulum short and tubercle-like, pre-apical diverticulum well developed and sac-like. The same condition has been shown in *Phlaeoba infumata* Brunner by Slifer (1939, fig. 49) and in *Phlaeoba panteli* Bolivar by Katiyar (1956, fig. 1b).

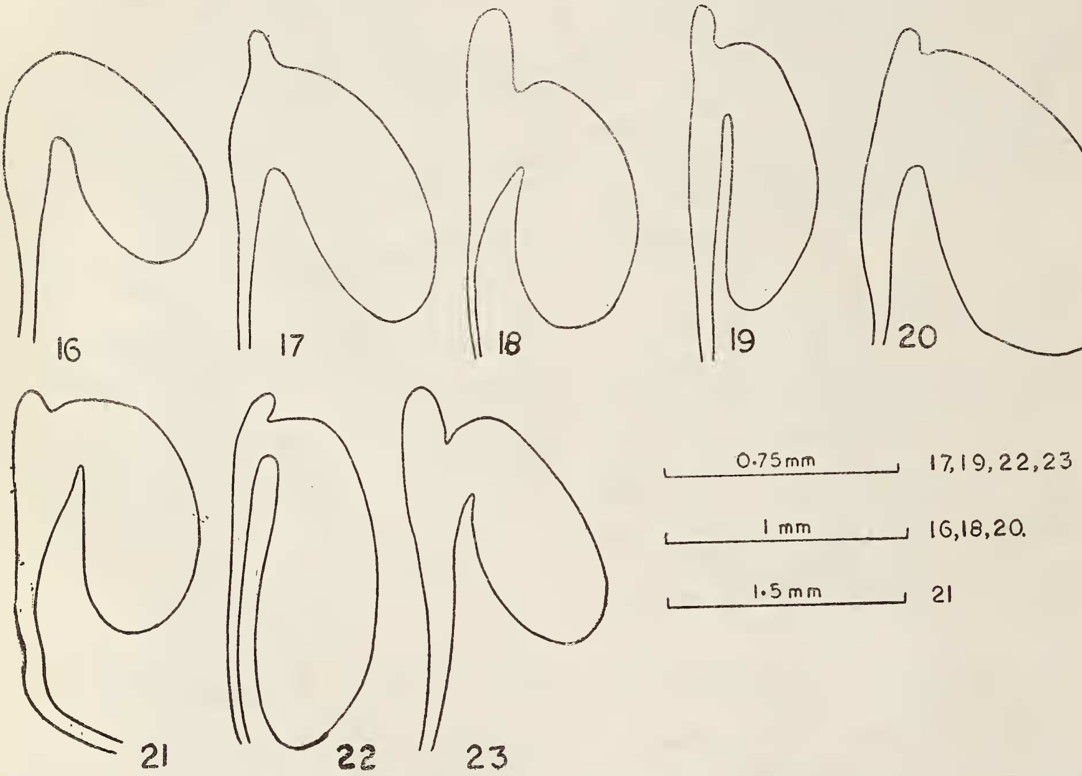

Fig. 16. *Oedaleus abruptus* (Thunberg); Fig. 17. *Aiolopus affinis* (Bolivar); Fig. 18. *Trilophidia annulata* (Thunberg); Fig. 19. *Acrotylus humbertianus* (Saussure); Fig. 20. *Gastrimargus transversus* (Thunberg); Fig. 21. *Locusta migratoria* (Linnaeus); Fig. 22. *Dociostaurus decisus* (Walker); Fig. 23. *Dociostaurus apicalis* (Walker).

Subfamily : OEDIPODINAE

16. **Oedaleus abruptus** (Thunberg) (fig. 16)—Apical diverticulum absent, pre-apical diverticulum broad and much developed. The same condition has been shown in the same species by Katiyar (1956, fig. 3d).

In the following species the apical diverticulum short, not much developed; pre-apical diverticulum broad and sac-like.

Aiolopus affinis (Bolivar) (fig. 17);

Trilophidia annulata (Thunberg) (fig. 18);

Acrotylus humbertianus (Saussure) (fig. 19);

Gastrimargus transversus (Thunberg) (fig. 20);

Locusta migratoria (Linnaeus) (fig. 21);

The same condition has been shown in *Aiolopus tamulus* (Fabricius), *A. thalassinus* (Fabricius) ; *Acrotylus insubricus* (Scop) ; *Gastrimargus africanus* (Saussure) and *Oedaleus senegalensis* (Krauss) by Slifer (1939), (figs. 7, 8, 63, 76 and 84).

Subfamily : GOMPHOCERINAE

Apical diverticulum short, pre-apical diverticulum broad and sac-like in *Dociostaurus decisus* (Walker), *D. apicalis* (Walker) (figs. 22, 23). In *Dociostaurus anatolicus* Krauss apical diverticulum well developed (Slifer 1939, fig. 23).

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